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Stability indicating HPLC method for simultaneous determination of methocarbamol and nimesulide from tablet matrix

R. S. Manmode[1], A. K. Dhamankar[2], J. V. Manwar[3*] and S. S. Laddha[4]

[1]*Department of Chemistry, 1 University Ave., University of Massachusetts Lowell, USA*
[2]*Departmrnt of Pharmaceutics, Allard College of Pharmacy, Pune, India*
[3]*Department of Pharmaceutical Analysis, Institute of Pharmacy, Akola, India*
[4]*Ideal College of Pharmacy and Research, Thane, India*

ABSTRACT

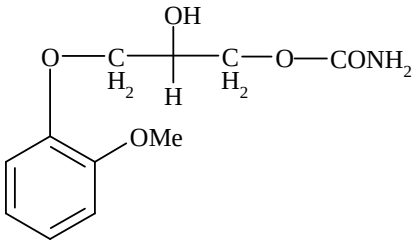
A reverse phase HPLC method has been developed for simultaneous estimation of methocarbamol and nimesulide in a tablet formulation. The separation was achieved by using Supelcosil LC-8 (4.6 mm I.D x 250 mm) column and methanol, water (60, 40 v/v) as an eluent, at flow rate of 1.0 mL/min. Detection was monitored at 276 nm. The retention time of methocarbamol and nimesulide was found to be 3.81 and 5.93 min respectively. The validation of the proposed method was also carried out for linearity, accuracy and precision. The dynamic range for methocarbamol and nimesulide was 0 to 0.5 mg/mL and 0 to 0.05 mg/mL respectively. The percentage recoveries obtained for methocarbamol and nimesulide were 100.39 and 99.74 respectively. The developed method was found to be simple, precise and accurate, and it can be used for routine quality control analysis of these drugs in combination tablets.

Key words: Methocarbamol, Nimesulide, RP-HPLC, and Tablets.

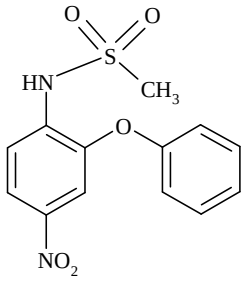
INTRODUCTION

Methocarbamol [1,2-propandiol-3-(2-methoxyphenoxy)-1-Carbamate] is a centrally acting skeletal muscle relaxant [1]. Nimesulide [N-(4-nitro-2-phenoxyphenyl) methane sulfonamide] is a non-steroidal anti-inflammatory agent [2]. Methocarbamol in combination with nimesulide is used in painful muscle spasm associated with musculoskeletal disorder. Literature survey revealed various methods such as derivative spectrophotometry [3], gas chromatographic [4] and liquid chromatographic [5-7] methods have been reported for estimation of methocarbamol alone and in combination with other drugs. UV-spectrophotometry [8], liquid chromatographic [9-22]

and polarography [23] methods have been reported for estimation of nimesulide alone and in combination with other drugs. The methods reported for estimation of methocarbamol and nimesulide from tablet dosage form are RP-HPLC [24] and HPTLC [24]. The aim of this work was to develop a new reverse phase HPLC method using C-8 column for the simultaneous estimation of methocarbamol and nimesulide from tablet dosage form in tablet dosage form, which is simple, precise and accurate.



Methocarbamol



Nimesulide

MATERIALS AND METHODS

Reagents and chemicals

The drug sample of Methocarbamol and Nimesulide was obtained as gift sample from M/s Khandelwal Laboratories Ltd., Dadra. Methanol HPLC grade and Water HPLC grade of Rankem Ltd., New Delhi were used. Drug product samples (tablets) were obtained from local market. Labeled claim of methocarbamol and nimesulide were 1000 mg and 100 mg, respectively.

Instrumentation

A Shimadzu HPLC SPD-10AVP system with Csw software with UV/Vis detector and a universal injector 7725i (Rheodyne) with 20.0µL loop was used.

Chromatographic conditions

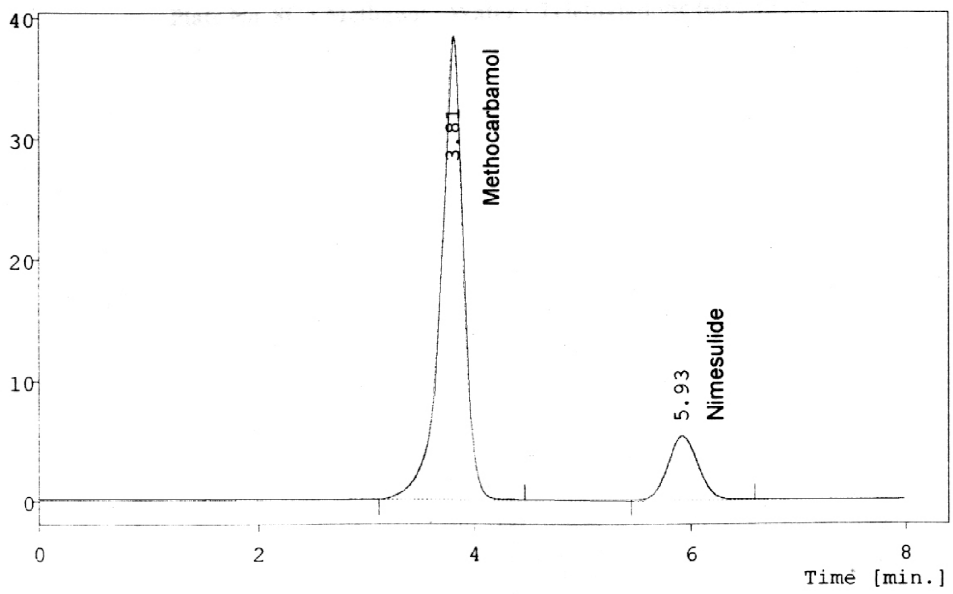
Chromatographic separations were achieved using a Supelcosil LC-8 (4.6 mm I.D x 250 mm) column. The mobile phase consisting of methanol and water (60, 40 v/v) was passed through 0.45µ membrane filter and degassed by ultrasonication. The flow rate was maintained at 1.0 mL/min and the measurements were made at 276 nm. The column and HPLC system was kept at ambient temperature.

Selection of mobile phase

For the selection of mobile phase, various solvents individually and in combinations were tried and a mobile phase containing methanol, water (60, 40 v/v) was selected, as both the drugs methocarbamol and nimesulide were resolved with reasonable retention times with sharp peaks. It was filtered before use through Whatman filter paper no. 41.

Preparation methocarbamol standard stock solution

Accurately weighed 200 mg of methocarbamol was dissolved in 100.0 mL of methanol and 5.0 mL of the resultant solution was further diluted to 50 mL with methanol (0.2 mg/mL). It was filtered through 0.45µ membrane filter.



Typical Chromatograms of methocarbamol and nimesulide

Preparation of nimesulide standard stock solution

Accurately weighed 20 mg of nimesulide was dissolved in 100.0 mL of methanol and 5.0 mL of the resultant solution was further diluted to 50 mL with methanol (0.02 mg/mL). It was filtered through 0.45µ membrane filter.

Preparation of combined standard stock solution

Accurately weighed quantities of methocarbamol (~200 mg) and nimesulide (~20 mg) were dissolved in 100.0 mL of methanol and 5.0 mL of the resultant solution was further diluted to 50.0 mL with methanol (0.2 mg/mL). It was filtered through 0.45µ membrane filter.

Study of system suitability parameters

The system suitability test was performed by collecting data from five replicate injections of mixed standard solution. The data obtained are presented in Table 1.

Table 1. System suitability parameters

Parameters	Methocarbamol	Nimesulide
Asymmetry	0.707	1.100
Resolution factor	---	4.724
Capacity factor	2.82	4.93
Theoretical plates Per column	1836	2246
Calibration range (mg/ml)	0-0.5	0-0.05

Study of linearity

To study the linearity of the drugs, a series of dilutions were made from the standard stock solution in the range of 0 to 0.5 mg/mL of methocarbamol and 0 to 0.05 mg/mL of nimesulide. A

graph was plotted as concentration of drugs versus peak area response, and it was found to be linear for both the drugs.

Assay of tablets

Twenty tablets were weighed and crushed to fine powder. Powder equivalent to 0.2 mg of methocarbamol and 0.02 mg of nimesulide was taken in 100 mL volumetric flask and was dissolved in about 50 mL of methanol. The flask was shaken for 20 minutes and finally volume was made up to 100 mL with methanol. The solution was then filtered through 0.45µ membrane filter and filtrate was used for analysis.

Procedure

The chromatographic conditions were set as per the given parameters and mobile phase was allowed to equilibrate with the stationary phase as was indicated by steady base line. A 20.0µL each of standard and sample solutions were injected separately and chromatogram was recorded. The approximate retention time for methocarbamol and nimesulide was 3.81 min and5.93 min, respectively. From the respective areas obtained in standard and sample chromatogram, the contents were calculated. The data are presented in Table 2.

Table 2. Results of analysis of tablet formulation by proposed method

	% Drug Estimated	
	Methocarbamol	**Nimesulide**
Mean*	100.86	100.19
± S.D.	1.601	1.604
% R.S.D.	1.587	1.601

**Mean of four observations*

Recovery studies

To study the accuracy, reproducibility and precision of the proposed method, recovery study was carried out by addition of standard drug solutions to preanalysed sample. Results of recovery studies are shown in Table 3.

Table 3. Recovery study of proposed method

	%Recovery	
	Methocarbamol	**Nimesulide**
Mean*	100.09	99.74
± S.D.	0.473	0.861
% R.S.D.	0.473	0.863

**Mean of four observations*

RESULTS AND DISCUSSION

The percentage recovery values obtained lie within the standard limit of 99 to 101, which confirm that the method is accurate and free from any positive or negative interference of the excipients. The low value of standard deviation obtained confirms the precision of the method. A linear relationship was obtained for methocarbamol and nimesulide in the range of 0 to 0.5 mg/mL and 0 to 0.05 mg/mL for methocarbamol and nimesulide respectively. Data from study of system suitability parameters indicate conformity to compendial requirements.

CONCLUSION

The proposed reversed phase HPLC method for simultaneous estimation of methocarbamol and nimesulide in a tablet dosage form is simple, precise and accurate. The method is linear in the range reported. Sample preparation is very easy, as it prepared in methanol. It does not suffer from any interference due to common excipients present in pharmaceutical preparations and can be used for routine quality control analysis.

REFERENCES

[1] The United States pharmacopoeia-XXX, National Formulary-XXV, U.S. Pharmacopoeial Convention INC., Rockville **2007**, 2610.
[2] British Pharmacopoeia, H. M. Stationary Press, London, **2002**, 2, 999.
[3] N Erk, Y Ozkan, E Banoglu, SA Ozkan, Z Senturk, *J Pharm Biomed Anal*. **2001,** 24, 3, 469-475.
[4] R T Sane, S R Surve, M G Gangrade, V V Bapat, N L Chonkar, *Indian Drugs*, **1993**, 30, 2, 66-72.
[5] J T Stewart, I L Honingberg, J W Coldern, *J Pharm Sci.* **1979**, 68, 1, 32-36.
[6] S Alessi-Severini, R T Coutts, F Jamali, F F Pasutto, *J Chromatogr Biomed Appl*. **1992**, 120, 173-179.
[7] M Vasudevan, S Ravishankar, T Ravibabu, M J Nanjan, *Indian Drugs*, **2000**, 37, 8, 386-389.
[8] P Fellarena, B Roberto, K Padmapriya, N Ravendra, *Drug Dev Indust Pharm.* **2000**, 26, 2, 229-334.
[9] Zeng, Zhu, Zhang Hanping, *Zhongguo Yaoxue Zazhi*, **1996**, 31, 10, 610-612.
[9] Ding Li, Zhang Zhengixing Gao, Ling Chen, Hauzhe Yu, Guiying, An Dengku, *Zhongguo Yaoke Daxne Xuebao*, **1998**, 29, 5, 370-373.
[10] Pan Xigui, Ma Fuwang, Lu Janwel, *Zhongguo Yiyuan Yaoxue Zazhi*, **1999**, 19, 4, 207-208.
[11] S K Gupta, L Alwar, J P Dasgupta, *J Pharmacol.* **1995**, 58, 3, 95-98.
[12] David J Jaworowics, Jr. Filipowski Melissa, T Boje, M K Kathleen, *J Chromatogr B. Biomed Sci. Appl.*, **1999**, 723, 1, 293-299.
[13] G Khaksa, N Udupa, *J Chromatogr B. Biomed Sci. Appl.* **1999**, 727, 1, 241-244.
[14] A Alvarez-Lueje, P Vasguez, J Nunez-Vergaraz, J A Squella, *Anal Lett.* **1998**, 31, 7, 1173-1184.
[15] Zhang, Xian-Zhou, Luo, Shun-de, Liu Cai, Hang-Sheen, *Zhongguo Yiago Gongye Zazhi*, **1998**, 29, 40, 182-183.
[16] Wang Xiayan, Li Shufang, Zhao Gieshang, Zhang, Xiangli, Wiu, Hongxing, *Zhongguo Yaoxue Zazhi*, **1998**, 33, 5, 295-297.
[17] S S Zarapkar, N P Bhandari, U P Halkar, *Indian Drugs.* **2000**, 37, 10, 469-473.
[18] B Raman, D Patil, *Indian Drugs.* **2000**, 37, 10, 437-440.
[19] Swaisland GL, Wilson LA, Wilson LD, *J Planar Chromatogr Mod TLC,* **1997**, 10, 9, 372-374.
[20] K E Nagoji, J Panda, S Rao, Srinivasa, S S Patro, *Asian J Chem.*, **2002**, 14, 1, 339-343.
[21] V V Vaidya, M Khanolkar, J N Gadre, *Indian Drugs*, **2001**, 38, 4, 170-173.
[22] Y M Reddy, P R Reddy, C S Reddy, S J Reddy, *Ind J Pharm Sci.* **1996**, 58, 3, 96-99.
[23] B Raman, S K Kulkarni, N S Kanyawar, *Indian Drugs*. **2002**, 39, 10, 536-539.
[24] S B Bagade, D B Meshram, J V Manwar, M R Tajne, *J Pharm Res.* **2006**, 5, 4, 137-139.